

the protonema can live for 7 months without producing a leafy shoot. He observed also the movement of "chomatophores," which became scattered in a day when the protonema is placed in light, and when the direction of light is changed they all turn toward it in 7-10 days. Blue and violet light proved to be more favorable than any other of the visible rays, excepting of course white light. The optimum temperature for the development of the leafy shoot is 16-25° C.; the protonema does not die so long as the temperature is above -20.5° C., but the leafy shoot dies at -18° C. The spore at a temperature of 16-25° C. germinates in one month.—J. M. C.

Angiosperm wood lacking vessels.—BAILEY and THOMPSON,²² in continuing their work on certain genera of angiosperms in which true vessels are absent from the normal wood of the stem, have obtained additional evidence. Their attention had been called to the occurrence of vessel-like structures in injured roots of a species of *Drimys*, which might indicate that the ancestors of the 3 genera investigated possessed true vessels. An examination of these structures has led to the conclusion that they are not vessel-like in structure, but are typical tracheids, which occur as well in uninjured stems of the 3 genera. They maintain, therefore, that true vessels do not occur in the xylem of these genera, and that there is no evidence that their ancestors possessed true vessels.—J. M. C.

Permeability.—PAINE and SAUNDERS²³ find that the testa of the pea is impervious to various reagents dissolved in water (copper ferrocyanid, sodium chloride, safranin) due to a waxy bloom deposited on the outer surface. This bloom is easily rubbed off so that the testa becomes pervious. In the wrinkled peas the bloom rubs off on the wrinkles, leaving the depressions still impervious, while in the smooth pea the bloom rubs off uniformly on the whole surface. It is interesting to find such a superficial layer responsible for the peculiar permeability characters of seed coats, for these characters are generally determined by deeper layers.—WM. CROCKER.

Agaricaceae of Michigan.—KAUFFMAN,²⁴ in connection with his very full presentation of the Agaricaceae of Michigan, has monographed *Russula* (pp. 118-167), *Pholiota* (pp. 289-314), and *Cortinarius* (pp. 314-442), as represented in the state. In *Russula* he recognizes 53 species, 3 being new and 27 edible; in *Pholiota* 26 species, 4 of which are edible; in *Cortinarius* 154 species, 13 of which are new and 10 edible. As an illustration of the activity of CHARLES

²² BAILEY, I. W., and THOMPSON, W. P., Additional notes upon the angiosperms *Tetracentron*, *Trochodendron*, and *Drimys*, in which vessels are absent from the wood. *Ann. Botany* 32:503-512. *pl. 16. figs. 9.* 1918.

²³ PAINE, S. G., and SAUNDERS, L. M., On a peculiarity exhibited by the testa of wrinkled peas. *Ann. Botany* 32:175. 1918.

²⁴ KAUFFMAN, C. H., The Agaricaceae of Michigan. *Mich. Geol. and Biol. Survey, Publ. Biol. Series 5.* December 1918.